Lesson 9

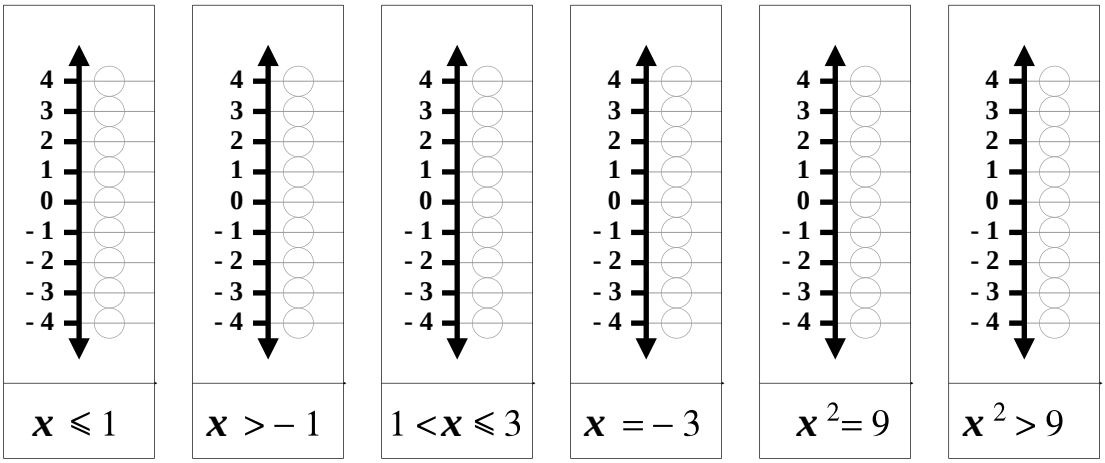
GCSE : Algebra of Inequalities

9.1 REVISION

Do NOT use a calculator

Question 1

On the number ladders below, draw the inequalities;



Question 2

Solve these inequalities;

(i) $5x + 17 < 52$ **(ii)** $0.8 + 2.6x > -1.8$

(iii) $-\frac{3}{8} + 2x \geqslant \frac{5}{8}$ **(iv)** $18 - 3x \leqslant 9$

(v) $7(x-5) > 42$ **(vi)** $\frac{x}{5} + 12 < 19$

Question 3
In each of the following, list the possible values of x;

(i) x is EVEN and $41 < x < 47$.

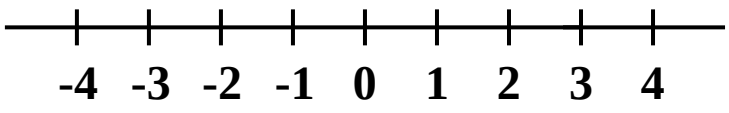
(ii) x is SQUARE and $45 < x < 100$.

(iii) x is INTEGER and $\pi < x < 2\pi$

Question 4
True or False ?
If y is a year in the 19^{th} century then $1800\text{AD} \leqslant y < 1900\text{AD}$

Question 5
(i) Solve the inequality $-22 \leqslant 5x - 7 < -7$

(ii) On the number line, represent the solution to part **(i)**.



Question 6

Solve the following inequality;

$$\frac{3x + 7}{2} \geqslant 44$$

Question 7

Solve these inequalities;

(i) $5 < x - 13 \leqslant 8$ **(ii)** $48 - 5x > -12$

(iii) $9x + 17 > 5x + 45$ **(iv)** $39 \leqslant 3(x + 8) < 66$

Question 8

If $x^2 < 36$ and x is a negative integer, what are the possible values of x ?

Question 9

This question is about solving the quadratic inequality

$$x^2 - 10x + 21 \leqslant 0$$

This is to be tackled by first plotting the graph of the related equality,

$$y = x^2 - 10x + 21$$

(a) To that end first complete the following table;

x	0	1	2	3	4	5	6	7	8	9	10
x^2				9	16					81	
$-10x$					- 40				- 80		
+21	21	21			21						21
y					- 3						

(b) On the grid on the opposite page, graph the equality.

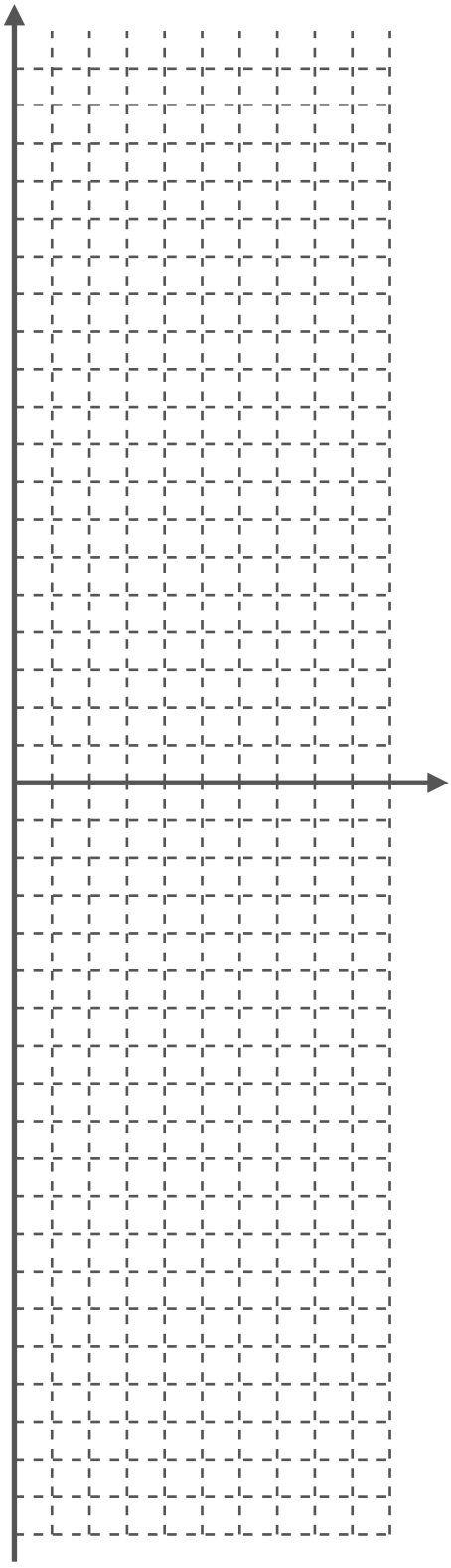
(c) From your graph, solve the quadratic inequality

$$x^2 - 10x + 21 \leqslant 0$$

giving your answer in the form

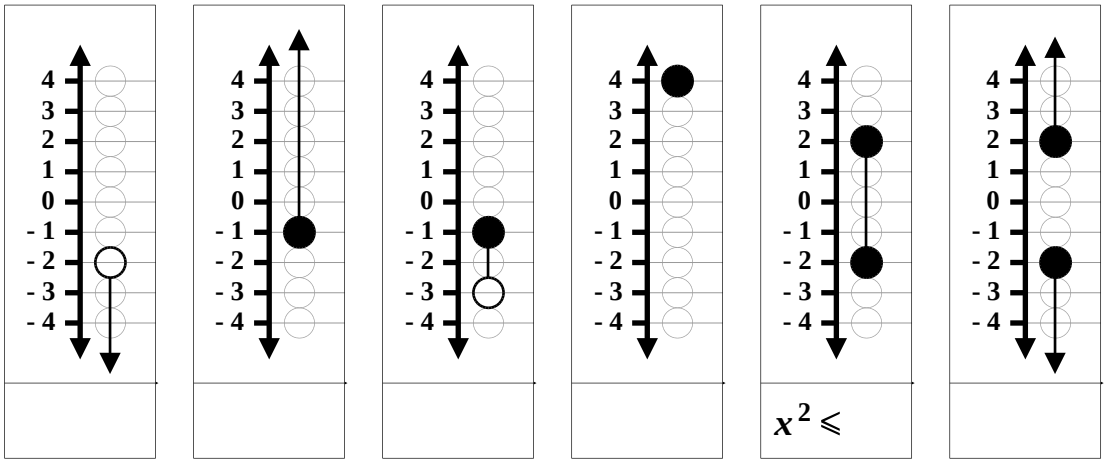
$$a \leqslant x \leqslant b$$

where a and b are numbers you must find.



Question 10

Write out in algebra the inequalities illustrated below;



Question 11

Solve the following inequality;

$$10 \leqslant 43 - 3x < 37$$

Question 12

Let P be the amount of petrol in my car's tank.

(a) Write down the following statements as inequalities;

(i) My car's petrol tank can hold 38 litres.

(ii) I put 24 litres of petrol in my car this morning.

(b) Combine the information of part (a) as an inequality of the form

$$a \leqslant P \leqslant b$$

where a and b are numbers you must find.

NOTE : The TEST will also include several questions on inequality graphs.